FREE FLOATING SUB-FLOOR PANEL

FIELD OF THE INVENTION

The present invention relates to floor panels and more particularly, to free floating sub-floor panels capable of supporting a floor and having a rigid waterproof lower layer that permits moisture drainage and air circulation.

BACKGROUND OF THE INVENTION

A finished floor typically consists of a sub-floor and a flooring surface, supported by the sub-floor. The nature of a sub-floor will vary depending on the flooring surface it needs to support and the environment in which it must function. For example, for linoleum tile or carpet on a main floor of a house, the sub-floor may simply consist of sheets of plywood. For a ceramic tile floor a cement layer will typically also be required.

Basement flooring presents additional challenges, one of which is the possibility of moisture being present and another which is to insulate the floor from what could be a very cold underlying surface of poured concrete. Fixed sub-floors or "non-floating" sub-floors can be used in basement applications. This type of flooring may have an underlying sheet of semi rigid plastic having depending protrusions over which is placed a series of plywood panels. The panels are securely fixed to the underlying floor using concrete bolts. Fixed sub-floors may be rather labour intensive to install and rely on secure and frequent fastening to prevent movement between adjacent flooring sheets.

U.S. Patent No. 4,945,697 to Ott et al. which teaches a floor tile and floor for direct installation on a support such as a floor or walkway without a sub-floor. This patent teaches a floor system that uses floor tiles comprised of two layers, an upper layer made of ceramic material and a lower layer made from resilient material with anti-skid characteristics. The two layers are secured together to form a floor tile. The lower layer includes drainage channels on the underside, that allow the passage of water underneath the floor tiles. When used outside, the tiles are spaced apart with gaps between adjacent tiles to allow vertical movement between the tiles. When the floor tiles are used indoors, the gap between adjacent tiles is filled with a flexible material that allows vertical shifting of the tiles. These tiles will not provide a rigid sub-floor layer that would be capable of use in a sub-floor application for supporting a further rigid floor layer on top of the tiles, since any vertical motion between adjacent tiles would cause the further floor layer to crack.

Another example of a non sub-floor application is U.S. Patent No. 5,950,378 to Council et al. This patent describes a composite modular floor tile for use in athletic playing surfaces such as basketball courts and tennis courts. The floor tile has a top and a bottom member with support nodes extending from the bottom member which provide an air circulation space underneath the floor tiles. The bottom member is made from a resilient impact absorbing material that would not provide a rigid supporting layer and therefore would not be suitable in a sub-floor application.

Accordingly, it is an object of the present invention to provide a sub-floor panel capable of supporting a floor that will allow moisture drainage and air circulation between the tiles and the underlying surface.

SUMMARY OF THE INVENTION

A floor panel is provided that is capable of supporting a floor surface and provides under-floor drainage. The floor panel has an upper member and a lower member attached to the upper member. The upper member is made from a sheet flooring material and the lower member is made from a waterproof sheet material. The lower member has a plurality of projections extending away from the panel to support the floor panel above an underlying surface and to permit moisture to drain between the floor panels and the underlying surface.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the invention are described below with reference to the accompanying drawings, in which:

Figure 1 is a scrap perspective schematic view of the panels of the invention;

Figure 2 is an underside plan of a floor panel according to a preferred embodiment of the invention taken in the direction of Arrow 2 of Figure 1, and showing the lower member with a series of projections and a tongue projecting out from two of the panel edges;

Figure 3 is a side elevation of the floor panel of Figure 2 taken in the direction of the stations 3-3;

Figure 4 is an enlarged scrap elevation of the floor panel of Figure 3 indicated in the circle 4, but inverted from Figure 3 to show the panel in its installed orientation, with one of the projections shown in sectional view and adjacent floor panels shown in chain dot outline;

Figure 5 is a similar view to Figure 4, but showing the area in the direction of stations 5-5, and an adjacent floor panel shown in chain dot outline;

Figure 6 is a clam-shell exploded perspective view of two of the floor panels to show the tongue and groove relationship;

Figure 7 is a side elevation similar to Figure 3 of an alternative embodiment showing the panels with a key and groove arrangement; and

Figure 8 is a clam-shell exploded perspective view of two floor panels of the embodiment of Figure 7 to show a loose key in its relationship.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference is first made to Figures 1 to 3 to describe a preferred embodiment of the floor panel, designated generally by the numeral 10. The floor panel 10 includes an upper member 12 of sheet flooring material and a lower member 14. The lower member 14 is attached to the upper member 12. The lower member 14 may be of polyethylene or other suitable waterproof sheet material and includes a plurality of projections 16 which rest on an underlying surface 11 to support the floor panel 10 on the underlying surface 11 and allow moisture to drain between them and to permit air circulation between the floor panel 10 and the underlying surface 11 when the floor panel 10 is installed. Figure 1 illustrates a series of floor panels 10 adjacent and interlocking one another.

In a preferred embodiment, the floor panel 10 is attached to the adjacent floor panel 10 using a tongue 18 and a groove 20 arrangement, which will be described later.

The floor panel 10 will now be described in more detail. As seen in Figure 2, the floor panel 10 may be square, and is preferably manufactured as a 4' by 4' panel, although other sizes may also be manufactured. The upper member 12 is attached to the lower member 14 using an adhesive 22. The adhesive 22 must be compatible with the upper member 12 and the lower member 14. In a preferred embodiment where the lower member 14 is of polyethylene, the adhesive 22 is Fastbond 2000-NF™ manufactured by 3M Canada Company.

In a preferred embodiment, the upper member 12 is made from random wafer board, such as manufactured and sold under the name Waferweld™ by Longlac Wood Industries Inc., as opposed to oriented strand board ("OSB"). Random wafer board is manufactured from wood chips that have a random orientation, as opposed to oriented strand board ("OSB") in which wood strands are oriented to lay in a perpendicular fashion with the majority of strands oriented to lay with the longitudinal direction of the board. The random orientation of the chips allows the random wafer board to expand evenly in all directions as opposed to longitudinal expansion tendencies characteristic of OSB which makes random wafer board less prone to buckling in this flooring application. The lower member 14 may be made from System Platon™ manufactured by Armtec Limited.

Turning now to Figure 4, the projections 16 extend away from the lower member 14 in the opposite direction to the upper member 12. The projections 16 are frustoconical shaped with a bottom surface 24 and a cavity 26 extending from the bottom surface 24 towards the upper member 12. Preferably the projections 16 are aligned in rows and columns to enable the floor panels 10 to be cut between the projections 16 without leaving any half-cut projections 16. When the floor panel 10 is installed, the bottom surface 24 of the projections 16 is located adjacent the underlying surface 11. In some applications further levelling of the floor panels 10 may be required if the underlying surface 11 is uneven. This can be achieved by stacking additional layers of the lower member 14 under the lower member 14 on the floor panel 10 in the areas where raising is required. The additional layers of the lower member 14 can be sized to fit the area that requires further leveling.

In order to connect adjacent floor panels, the panel sides may be configured in a tongue and groove arrangement. The upper member 12 of each floor panel 10 has a tongue 18 protruding from two adjacent sides and a groove 20 extending into each of the remaining sides. The groove 20 is sized and operable to receive the tongue 18 to interconnect adjacent floor panels. The tongue 18 is formed during manufacturing of the floor panel 10 by shaping the upper member 12.

In use, a series of floor panels are interlocked and located on an underlying surface 11, shown in Figure 1, and abutting walls 15. In the preferred embodiment, adjacent floor panels are interconnected using a tongue and groove arrangement as shown in Figures 4 to 6. Each floor panel 10 is placed with the projections 16 adjacent the underlying surface. In order to connect each floor

panel 10 to an adjacent floor panel 10, the tongue 18 of the floor panel 10 is inserted into the groove 20 located on the adjacent floor panel 10, as indicated by arrow A shown in Figure 6.

Although not illustrated, it will be appreciated that when the floor panels 10 have been installed over the underlying surface 11, an additional flooring surface can be laid on top of the floor panels 10. Excess moisture can flow between the projections 16 and air can circulate between the floor panels 10 and the underlying surface 11.

Turning now to Figures 7 and 8, an alternative interlocking arrangement to connect adjacent floor panels is shown. Each floor panel 10 has a groove 28 similar to the groove 20 described above, but running along all of the edges of the floor panel 10. To interlock adjacent floor panels, a key 30 which is sized to fit within the groove 28 is utilized. The groove 28 is operable to receive approximately half the width of the key 30. When the key 30 has been inserted into the groove 28 of the floor panel 10, an adjacent floor panel 10 can be attached to the protruding edge, the remaining half of the key 30.

To install the floor panels 10 that use a key and groove arrangement, the key 30 must first be inserted into the second groove 28 in the direction shown by arrows B in Figure 8. Once the key 30 is installed the floor panel 10 is inserted into the second groove 28 on an adjacent floor panel 10, in the direction shown by arrow C in Figure 8. Similarly, adjacent panels are interconnected until the required sub-floor coverage is achieved.

The preferred embodiment can be modified in many ways. For instance, the lower member 14 can be made from any suitable waterproof sheet material. The projections 16 can be located in a random pattern on the lower member 14. The interlocking structure of the tongue and groove arrangement can be any interlocking combination that will prevent significant vertical shifting between adjacent panels. Other adhesives may be used that are capable of securely bonding the upper member to the lower member.

The floor panel described as exemplary of the invention can be modified as required in such fortification within the scope of the description and invention and claims.

PARTS LIST

10	floor panel
11	underlying surface
12	upper member
14	lower member
15	walls
16	projections
18	tongue
20	groove
22	adhesive
24	bottom surface
26	cavity
28	groove
30	key